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10/098,650	03/15/2002	Bernhard Jakoby	10191/2310	7377

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/098,650
Filing Date: March 15, 2002
Appellant(s): JAKOBY ET AL.

Richard L. Mayer (Reg. No. 22,490)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 02/11/2005 appealing from the Office action mailed 08/04/2004.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

4,922,745	RUDKIN et al	5-1990
5,337,605	SCHULTZ et al	8-1994
6,479,763	IGAKI et al	11-2002

Martin et al., "Sensing liquid properties with thickness-shear mode resonator", Sensors and Actuators A 44 (1994) 2009-218

Kitsuto, Japanese Patent No. 0637339A

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-5, 7, 9-11, 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. ("Sensing liquid properties with thickness-shear mode resonator", Sensors and Actuators A 44 (1994) 209-218) in view of Rudkin et al. (US Patent 4,922,745), Schultz et al. (US Patent 5,337,605) and Igaki et al. (US Patent 6,479,763).

The following reasoned statement clarifies the grounds of rejection Examiner relied upon. The parts in bold type are changes from the discussion provided in the Final Rejection of 08/04/2004..

Regarding claims 1, 2, 13 Martin discloses device and method using piezoelectric properties of quartz crystal to determine density and viscosity of liquids (abstract and introduction). Figure 8 shows the device with a base with connectors and sensors. The base portion may be considered a bottom. The sensor resonance frequency changes "with liquid immersion". This is considered equivalent to an immersible **sensor device** being immersed in the liquid during a measurement of the

property of the liquid as in the instant invention. Texture on the resonator is shown to completely cover the sensor surface so Examiner considers the resonator may be completely immersed in the liquid during the measurement of the property of the liquid. Figure 8 also shows electric contact points for an electric control. **The contact points are highlighted below in gray.**

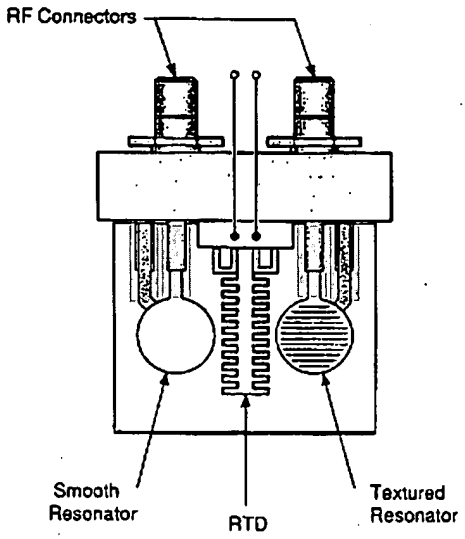


Fig. 8. Monolithic sensor that includes a smooth and a textured TSM resonator to measure liquid density and viscosity along with an RTD to measure temperature.

As the device is capable of functioning while immersed in liquid the contacts are considered to resistant to the liquid to some degree. The RF connectors shown in the figure allow the sensor leads to be connectable to a measuring unit outside the liquid **and are thus electric lead conductors.**

The reference does not expressly teach the sensor enclosed in a cap and at least one of a liquid inlet and liquid outlet, **thus forming a container.**

Rudkin discloses similar fluid transducer using fluid resonant interaction to discern viscosity and density (abstract) with sensor portions 41, 42, 43, 44, 47, 48

shown in figure 4 completely immersed in the fluid being measured. Rudkin teaches an optional shroud 103 surrounding the sensor elements and an orifice 105 in the end which allows ingress as well as egress of fluid to be metered (column 3 lines 25-54 and figure 1). **Installing the shroud taught by Rudkin on the base of Martin would enclose the sensor and form a container as in the instant invention.**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a shroud with fluid ingress (inlet) and egress (outlet) in order to offer protection which "may be important where foreign bodies within a metered fluid are likely to impact".

The references also do not expressly teach a conductive adhesive containing metal coupling the electric lead conductors to the electric contact points.

Schultz teaches using "metal-filled conductive adhesive" to make the conductive connection between sensor contact pads 23, 24 and leads 17, 18 (column 4 line 56 to column 5 line 2 and figure 11 at item 40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use metal filled adhesive potting to join the leads and pads as it advantageously "prevents corrosion or degradation of the connection" from moisture which would be a problem for a sensor immersed in liquid.

Finally, the references do not expressly teach the metal in the adhesive is in the form of particles.

Igaki teaches conductive adhesive agents used for joining electrical components "conventionally...have comprised metal particles such as conductive silver and copper,

etc., having been made to disperse in a viscous resin for fixation or cure-type resin paste."

It would have been obvious to one having obvious to one having ordinary skill in the art at the time the invention was made to use metal filler in the form of particles in a conductive adhesive because this is conventional practice. Conventional practices are advantageously conforming to established practice or accepted standards that simplify their use.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. ("Sensing liquid properties with thickness-shear mode resonator", Sensors and Actuators A 44 (1994) 209-218) as modified by Rudkin et al. (US Patent 4,922,745), Schultz et al. (US Patent 5,337,605) and Igaki et al. (US Patent 6,479,763) and applied to claim 1 and further in view of Kitsuta (JP 06347339A).

(10) Response to Argument

Regarding claim 1, Appellants argue (second full paragraph on page 6) Examiner's use of the term "container" in response to arguments in Office Action of 8/4/2004 is apparently inconsistent with Examiner's use of the same term in the subsequent prior art rejection in the same Office Action. According to Appellants:

> "the Examiner does not consider that Martin discloses a container (8/4/04 Office Action, p. 2). However, the Examiner nevertheless asserts that because the quartz wafer is immersed in liquid during a measurement of the liquid, the Examiner considers this to be 'equivalent to an immersible container being immersed in the liquid during a measurement."

Examiner regrets any confusion caused by apparent inconsistency.

When Examiner stated that he "does not consider that Martin discloses a container" it was with respect to an aforementioned context reciting "Examiner does not agree that the figure **shows** a vessel."

Examiner was responding to Applicants earlier argument (in 06/28/2004 response to non-final office action) reciting "The monolithic sensor disclosed in the Martin reference is not immersed in the liquid during the measurement of the liquid. Instead, the monolithic sensor disclosed in the Martin reference seals the liquid to be measured in a container.... As illustrated in the Martin reference, the base portion operates as a vessel for retaining the liquid being measured and as a complete barrier to anything surrounding the sensor."

In a subsequent phone interview with Applicant's attorney it became clear the attorney was confused by the Martin figure. Examiner recalls attorney believed the portion that I've highlighted below was a vessel, which along with the base prevented any liquid (apart from whatever might have already been contained therein when the apparent parts were assembled) from contacting the sensor portions. Examiner explained that the portion attorney thought was a vessel was actually the outline of the quartz substrate upon which the sensor electrode elements were overlaid. Figure 9 in Martin makes this clear by showing the device in cross section.

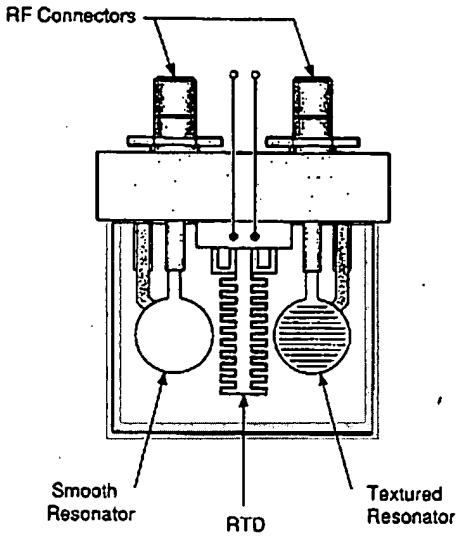
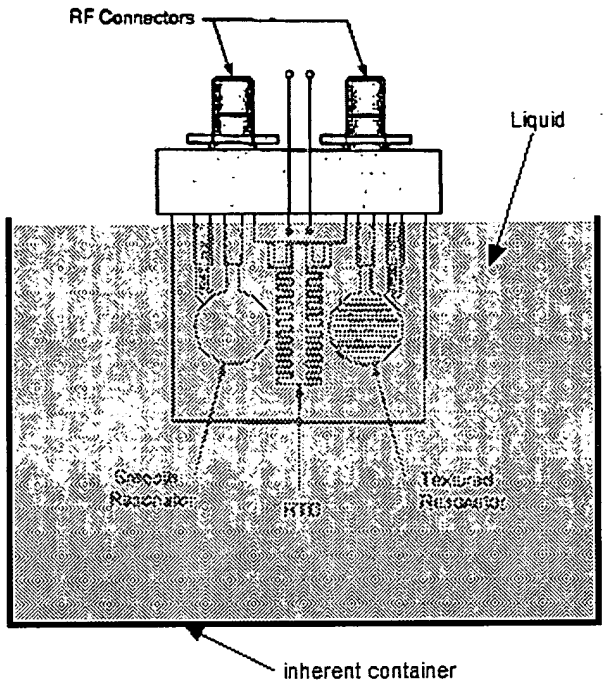


Fig. 8. Monolithic sensor that includes a smooth and a textured TSM resonator to measure liquid density and viscosity along with an RTD to measure temperature.

In the earlier response Examiner explained that despite the lack of an express disclosure of a container "Examiner nevertheless" asserted "that because the quartz wafer is immersed in liquid during a measurement of the liquid, the Examiner considers this to be 'equivalent to an immersible container being immersed in the liquid during a measurement.'"

Examiner considered that in order for there to be a liquid available for the immersion it must inherently be contained such that it would not run away from where it was being measured. Examiner envisioned the following for example as representing an inherent container.



Examiner should have made this clearer in the rejection. But what Examiner originally considered to be a container and whether it was inherent in Martin is moot because Examiner likewise misunderstood what Appellants considered to be a container in the application disclosure.

Examiner originally and incorrectly considered the container to be what held liquid 10 (which is not shown in the Application disclosure figure 1) in which the cap 21 and sensor 5 was immersed. The container disclosed by the Appellants is actually the combination of the base 20 and cap 21 shown in the disclosure figure. Accordingly, Martin only teaches the base portion of such a claimed container as shown in figure 8 of the reference (as reproduced below with light gray highlight).

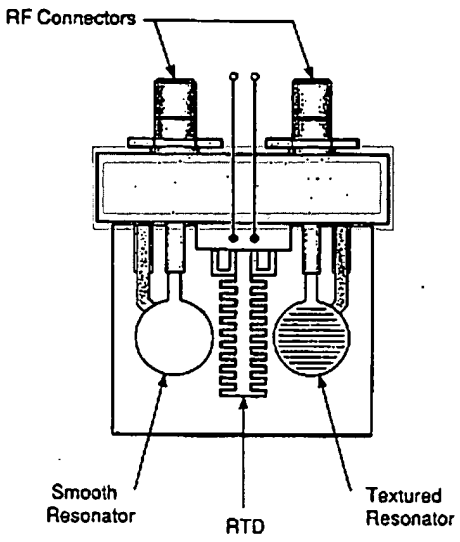


Fig. 8. Monolithic sensor that includes a smooth and a textured TSM resonator to measure liquid density and viscosity along with an RTD to measure temperature.

Nevertheless, the prior misunderstanding does not detract from what is clearly taught and suggested by the references as applied in the Examiner's rejection of the claims. Though Appellants argue (on pages 6, 7 and top of page 8) that Examiner's assertion about an inherent container is incorrect, it doesn't matter because what Examiner asserted was a container was not in the claim. Examiner further relied upon the Rudkin et al. reference showing shroud 103 (figure 1) to teach the cap that together forms a container in the same sense as the instant invention container.

Appellant, however, continues in arguing, "the **quartz wafer** disclosed in the Martin reference **does not enclose a piezoelectric sensor**, nor is there any suggestion of using an enclosing container" (page 8 first full paragraph).

Examiner never offered that Martin disclosed an **enclosing** structure. That is why Examiner cited the Rudkin reference.

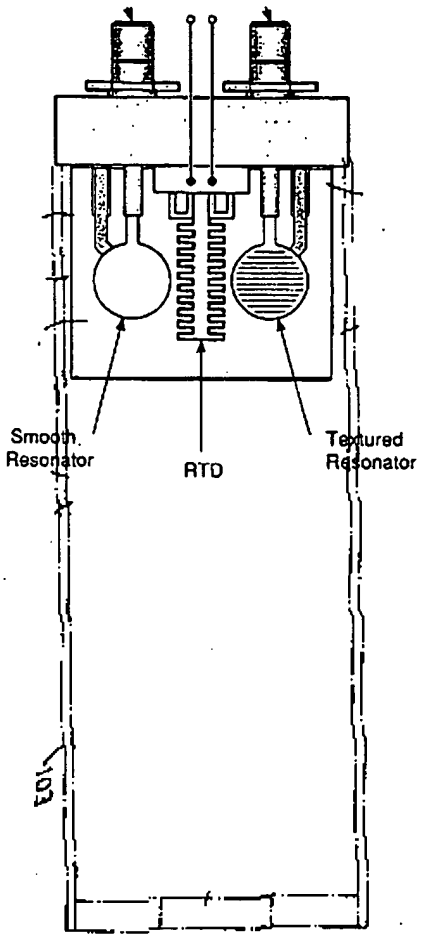
Regarding the Rudkin reference, Applicant argues (last paragraph of page 8 through page 9) the reason for combining Rudkin with Martin "is not found in the overall teaching of Martin or Rudkin". In summary, Appellant argues the reason for combining does not apply to the particular embodiment of the shroud that best teaches the features missing from Martin but contained in the instant invention claims, that is, a solid cap or shroud with a hole or port for allowing fluid in and out so that it may contact the sensor.

Rudkin teaches two different shrouds. Only one is shown and it is the one Examiner relied upon in the rejection because it has an orifice 105 that Examiner considered equivalent to the "at least one of a liquid inlet and liquid outlet" of the instant invention. The other shroud taught by Rudkin is not shown and is described as "arranged ...for example of wire mesh construction to provide protection for the fork structure without disrupting flow too severely."

Appellants are incorrect in asserting the reason that Examiner relied upon applies only to one (and not the one that looks like Appellant's). Appellants are also incorrect in asserting that the main purpose of the shroud shown in figure "is to alleviated a problem of increasing he fluid added mass when the fork structures of the transducer are proximate to boundaries and barriers." The primary purpose of the optional "wire mesh" shroud and "solid cylinder" shroud is to protect the sensor elements (read column 3 lines 25 to 54). The secondary purpose of the "solid cylinder" "alternative form" shroud is to allow for easily validated calibrations where the sensor in normal operation is used proximate to boundaries and barriers. And even if Rudkin had

not said the shroud was for protection of the sensor elements there is no question the solid shroud having an orifice 105 would have this effect. Furthermore, the wire mesh shroud would also fit the Appellants claim language as the inherent gaps between diagonal structures of the mesh would also constitute inlets or outlets.

Appellants argue (bottom of page 9 to top of page 10) that the piezoelectric sensors of Rudkin are "housed in one or more cavities within the tines. Thus, the piezoelectric sensor material is not exposed or immersed in the liquid during a measurement of the liquid and the **shroud does not offer any protection to the piezoelectric material**." Examiner considers the shroud does offer protection to both the tines and piezoelectric material within. A foreign body that may damage the tines will also damage the piezoelectric material's ability to perform its function. It may also damage the piezoelectric material directly with sufficient impact. In any case, the shroud applied to the Martin sensor device would certainly offer protection directly to the highly exposed elements of Martin. See below figure showing the Rudkin shroud superimposed on the Martin sensor.



Appellants also argue Martin does not disclose a "need to offer protection" (page 10). Though Martin does not expressly state that impact from foreign bodies may be a problem, neither the statement of problem nor motivation to combine need come solely from Martin. The "suggestion, teaching or motivation to combine may flow from the prior art **references** themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem being solved" *in re Dembiczak*. In this case the motivation came from the Rudkin reference. Besides, the Martin reference is a research paper directed towards developing basic theoretical workings of a vibrational type fluid sensor device, not towards the practical implementation of such a device in an

industrial or commercial setting where many other practical problems (such as foreign body impact) come to light.

Appellants also argue (bottom of page 10 through page 11) against combining the Schultz and Igaki references that teach metal filled adhesive to join leads with Martin because Martin already uses gold which is corrosion resistant and Examiner's cited reason for combining was because of corrosion prevention. As noted above, Examiner need not find the problem being solved or motivation to combine solely within the Martin reference. Martin may not have recognized a potential problem. While gold is admittedly good against corrosion Martin may have used it for a different reason such as superior conductance. But gold is soft and may wear away and gold is expensive. In any case, the Schultz reference provides both the teaching and a clear motivation to combine.

Appellant's arguments with respect to claim 6 which depends from claim 1 appears to be a based on Appellants allegation that the Examiner's application of Martin, Rudkin, Schultz and Igaki references to claim 1 is deficient. Please see discussion above.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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cdg
April 5, 2005

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